

- 23 -

Claims

1. A photodynamic therapy light source comprising:
a light source for producing illumination;
5 filter means having a plurality of filter
elements for filtering the illumination produced by the
light source to provide illumination in a specific
bandwidth; and
control means for receiving data from a database
10 of patient information and for controlling the
photodynamic therapy light source so as to provide a dose
of illumination at a specific wavelength bandwidth and for
a predetermined time period.
- 15 2. The photodynamic therapy light source of claim 1
wherein the filter means comprises a first filter wheel
having at least a filter element for transmitting
ultraviolet light, a filter element for transmitting
infrared light, and a filter element for transmitting
20 light in the visible spectrum, and a blank region for
preventing transmission of any light from the light
source, and a second filter wheel having a plurality of
filter elements for selecting a particular bandwidth of
wavelength for transmission through the second filter
25 wheel.
3. The photodynamic therapy light source of claim 2
wherein the first and second filter wheels include drive
means for rotating the filter wheel so as to bring a
30 selected one of the filter elements into alignment with
the light source so that light of the required wavelength
is provided.
4. The photodynamic therapy light source of claim 1
35 wherein the photodynamic therapy light source includes a
light guide for receiving the light from the filter means
and for conveying the light to a patient.

- 24 -

5. The photodynamic therapy light source of claim 1 wherein the photodynamic therapy light source includes a camera for providing an image of a region of the patient which is to be treated.

6. The photodynamic therapy light source of claim 5 wherein the camera is a charged couple device array and light is transmitted to the camera by an image fibre.

10

7. The photodynamic therapy light source of claim 6 wherein the image fibre is included in the light guide.

8. The photodynamic therapy light source of claim 1 wherein the photodynamic therapy light source includes a spectrum analyser for analysing the spectrum of reflected radiation from a region of the patient to be treated.

15

9. The photodynamic therapy light source of claim 8 wherein the spectrum analyser receives light reflected from the region of the patient via a fibre waveguide.

20

10. The photodynamic therapy light source of claim 9 wherein the fibre waveguide is included in the light guide.

25

11. The photodynamic therapy light source of claim 2 wherein the second filter wheel includes a tilt mechanism for tilting the filter wheel to shift the bandwidth provided by each of the filter elements of the second filter wheel.

30

12. The photodynamic therapy light source of claim 1 wherein the photodynamic therapy light source also includes a light intensity unit for measuring the intensity of light provided to the patient from the filter means and for determining the dose applied to the patient

35

- 25 -

based on the intensity of the light, and also the distance the light guide will be held away from the patient during treatment of the patient.

5 13. The photodynamic therapy light source of claim 1 wherein the control means is connectable to an external computer for storing the database and for enabling user input of commands and data.

10 14. The photodynamic therapy light source of claim 1 wherein the photodynamic therapy light source further comprises a modulating component for modulating the illumination to provide a treatment cycle comprised of a plurality of cycles wherein each cycle comprises a first
15 period in which illumination is applied to a patient followed by a second period in which no illumination is applied to the patient.

15. The photodynamic therapy light source of claim 14
20 wherein the modulating component is also for pulsing the illumination applied in each first period to provide pulsed illumination to the patient.

16. The photodynamic therapy light source of claim 14
25 wherein the modulating component may be a pulse width modulator circuit which electronically controls the light source to thereby modulate the illumination.

17. The photodynamic therapy light source of claim 14
30 wherein the modulating component comprises a first chopper element for chopping the illumination so that the illumination is applied to the patient during the first period, but is not applied to the patient during the second period, and a second chopping element for chopping
35 the illumination so that when the illumination is applied during the first period, the illumination is pulsed during the first period.

- 26 -

18. A photodynamic therapy light source comprising:
a light source for producing illumination;
a light guide for conveying light to a patient
5 for treating the patient; and
a camera for receiving light reflected from the
treatment area of the patient, so as to obtain an image of
the treatment area to provide a visual indication of the
progress of treatment.
- 10 19. The photodynamic therapy light source of claim 18
wherein the photodynamic therapy light source includes
filter means having a plurality of filter elements for
filtering the illumination provided by the light source to
15 provide illumination in a specific wavelength bandwidth.
20. The photodynamic therapy light source of claim 18
wherein the photodynamic therapy light source includes
control means for receiving data from a database of
20 patient information and for controlling the photodynamic
therapy light source to provide a treatment dose based on
the said information.
21. The photodynamic therapy light source of claim
25 19 wherein the filter means comprises a first filter wheel
having at least a filter element for transmitting
ultraviolet light, a filter element for transmitting
infrared light, and a filter element for transmitting
light in the visible spectrum, and a blank region for
30 preventing transmission of any light from the light
source, and a second filter wheel having a plurality of
filter elements for selecting a particular bandwidth of
wavelength for transmission through the second filter
wheel.
- 35 22. The photodynamic therapy light source of claim 21
wherein the first and second filter wheels include drive

- 27 -

means for rotating the filter wheel so as to bring a selected one of the filter elements into alignment with the light source so that light of the required wavelength is provided.

5

23. The photodynamic therapy light source of claim 18 wherein the light source includes a light guide for receiving the light from the filter means and for conveying the light to a patient.

10

24. The photodynamic therapy light source of claim 18 wherein the camera is a charged couple device array and light is transmitted to the camera by an image fibre.

15

25. The photodynamic therapy light source of claim 24 wherein the image fibre is included in the light guide.

20

26. The photodynamic therapy light source of claim 18 wherein the photodynamic therapy light source includes a spectrum analyser for analysing the spectrum of reflected radiation from a region of the patient to be treated.

25

27. The photodynamic therapy light source of claim 26 wherein the spectrum analyser receives light reflected from the region of the patient via a fibre waveguide.

30

28. The photodynamic therapy light source of claim 27 wherein the fibre waveguide is included in the light guide.

35

29. The photodynamic therapy light source of claim 21 wherein the second filter wheel includes a tilt mechanism for tilting the filter wheel to shift the bandwidth provided by each of the filter elements of the second filter wheel.

30. The photodynamic therapy light source of claim 18

- 28 -

wherein the photodynamic therapy light source also includes a light intensity unit for measuring the intensity of light provided to the patient from the filter means and for determining the dose applied to the patient based on the intensity of the light, and also the distance the light guide will be held away from the patient during treatment of the patient.

31. The photodynamic therapy light source of claim 20 wherein the control means is connectable to an external computer for storing the database and for enabling user input of commands and data.

32. The photodynamic therapy light source of claim 18 wherein the photodynamic therapy light source further comprises a modulating component for modulating the illumination to provide a treatment cycle comprised of a plurality of cycles wherein each cycle comprises a first period in which illumination is applied to a patient followed by a second period in which no illumination is applied to the patient.

33. The photodynamic therapy light source of claim 32 wherein the modulating component is also for pulsing the illumination applied in each first period to provide pulsed illumination to the patient.

34. The photodynamic therapy light source of claim 32 wherein the modulating component may be a pulse width modulator circuit which electronically controls the light source to thereby modulate the illumination.

35. The photodynamic therapy light source of claim 32 wherein the modulating component comprises a first chopper element for chopping the illumination so that the illumination is applied to the patient during the first period, but is not applied to the patient during the

- 29 -

second period, and a second chopping element for chopping the illumination so that when the illumination is applied during the first period, the illumination is pulsed during the first period.

5

36. A photodynamic therapy light source comprising:
a light source for providing illumination;
a light guide for conveying the illumination to a region of a patient to be treated; and

10

a spectrum analyser for receiving reflected light from the patient and for providing a spectrum of that light so as to provide an indication of the nature of treatment required, or the manner in which treatment is progressing.

15

37. The photodynamic therapy light source of claim 36 wherein the photodynamic therapy light source includes filter means having a plurality of filter elements for filtering the illumination provided by the light source to provide illumination in a specific wavelength bandwidth.

20

38. The photodynamic therapy light source of claim 36 wherein the photodynamic therapy light source includes control means for receiving data from a database of patient information and for controlling the photodynamic therapy light source to provide a treatment dose based on the said information.

25

39. The photodynamic therapy light source of claim 37 wherein the filter means comprises a first filter wheel having at least a filter element for transmitting ultraviolet light, a filter element for transmitting infrared light, and a filter element for transmitting light in the visible spectrum, and a blank region for preventing transmission of any light from the light source, and a second filter wheel having a plurality of filter elements for selecting a particular bandwidth of

30

35

- 30 -

wavelength for transmission through the second filter wheel.

40. The photodynamic therapy light source of claim 39 wherein the first and second filter wheels include drive means for rotating the filter wheel so as to bring a selected one of the filter elements into alignment with the light source so that light of the required wavelength is provided.

41. The photodynamic therapy light source of claim 36 wherein the light source includes a light guide for receiving the light from the filter means and for conveying the light to a patient.

42. The photodynamic therapy light source of claim 36 wherein the photodynamic therapy light source includes a camera for providing an image of a region of the patient which is to be treated.

43. The photodynamic therapy light source of claim 42 wherein the camera is a charged couple device array and light is transmitted to the camera by an image fibre.

44. The photodynamic therapy light source of claim 43 wherein the image fibre is included in the light guide.

45. The photodynamic therapy light source of claim 36 wherein the spectrum analyser receives light reflected from the region of the patient via a fibre waveguide.

46. The photodynamic therapy light source of claim 45 wherein the fibre waveguide is included in the light guide.

47. The photodynamic therapy light source of claim 39 wherein the second filter wheel includes a tilt mechanism

- 31 -

for tilting the filter wheel to shift the bandwidth provided by each of the filter elements of the second filter wheel.

5 48. The photodynamic therapy light source of claim 36 wherein the photodynamic therapy light source also includes a light intensity unit for measuring the intensity of light provided to the patient from the filter means and for determining the dose applied to the patient
10 based on the intensity of the light, and also the distance the light guide will be held away from the patient during treatment of the patient.

49. The photodynamic therapy light source of claim 38
15 wherein the control means is connectable to an external computer for storing the database and for enabling user input of commands and data.

50. The photodynamic therapy light source of claim 36
20 wherein the photodynamic therapy light source further comprises a modulating component for modulating the illumination to provide a treatment cycle comprised of a plurality of cycles wherein each cycle comprises a first period in which illumination is applied to a patient
25 followed by a second period in which no illumination is applied to the patient.

51. The photodynamic therapy light source of claim 50 wherein the modulating component is also for pulsing the
30 illumination applied in each first period to provide pulsed illumination to the patient.

52. The photodynamic therapy light source of claim 50 wherein the modulating component may be a pulse width
35 modulator circuit which electronically controls the light source to thereby modulate the illumination.

- 32 -

53. The photodynamic therapy light source of claim 50 wherein the modulating component comprises a first chopper element for chopping the illumination so that the illumination is applied to the patient during the first period, but is not applied to the patient during the second period, and a second chopping element for chopping the illumination so that when the illumination is applied during the first period, the illumination is pulsed during the first period.

10

54. A photodynamic therapy light source, comprising:
a light source for producing illumination;
filter means having a plurality of filter elements for filtering the illumination produced by the light source to provide illumination in a specific bandwidth; and

a modulating component for modulating the illumination so that the illumination is applied to a patient in a plurality of cycles with each cycle comprising a first period in which illumination is applied and a second period in which illumination is prevented from being applied to the patient.

15

20

55. The photodynamic therapy light source of claim 54 wherein the light source includes a controller for controlling the modulating component to thereby provide the first period in which illumination is applied to the patient, and the second period in which no illumination is applied to the patient.

25

30

56. The photodynamic therapy light source of claim 55 wherein the controller is for controlling the modulating component so that the first period is always longer in time than the second period.

35

57. The photodynamic therapy light source of claim 55 wherein the controller further controls the modulating

- 33 -

component to pulse the illumination during the first period so that pulsed illumination is applied to the patient during the first period.

5 58. The photodynamic therapy light source of claim 54 wherein the modulator component comprises a pulse width modulator circuit.

10 59. The photodynamic therapy light source of claim 54 wherein the modulator component comprises a first chopper for chopping the illumination to provide the first period in which illumination is applied to the patient, and the second period in which no illumination is applied to the patient.

15 60. The photodynamic therapy light source of claim 59 wherein the modulating component further comprises a second chopper for chopping the illumination to pulse or modulate the illumination which is applied during the first period.

20 61. The photodynamic therapy light source of claim 54 wherein the filter means comprises a first filter wheel having at least a filter element for transmitting ultraviolet light, a filter element for transmitting infrared light, and a filter element for transmitting light in the visible spectrum, and a blank region for preventing transmission of any light from the light source, and a second filter wheel having a plurality of filter elements for selecting a particular bandwidth of wavelength for transmission through the second filter wheel.

30 62. The photodynamic therapy light source of claim 61 wherein the first and second filter wheels include drive means for rotating the filter wheel so as to bring a selected one of the filter elements into alignment with

- 34 -

the light source so that light of the required wavelength is provided.

63. The photodynamic therapy light source of claim 54
5 wherein the photodynamic therapy light source includes a light guide for receiving the light from the filter means and for conveying the light to a patient.

64. The photodynamic therapy light source of claim 54
10 wherein the photodynamic therapy light source includes a camera for providing an image of a region of the patient which is to be treated.

65. The photodynamic therapy light source of claim 64
15 wherein the camera is a charged couple device array and light is transmitted to the camera by an image fibre.

66. The photodynamic therapy light source of claim 65
20 wherein the image fibre is included in the light guide.

67. The photodynamic therapy light source of claim 54
wherein the photodynamic therapy light source includes a spectrum analyser for analysing the spectrum of reflected radiation from a region of the patient to be treated.

68. The photodynamic therapy light source of claim 67
wherein the spectrum analyser receives light reflected from the region of the patient via a fibre waveguide.

69. The photodynamic therapy light source of claim 68
30 wherein the fibre waveguide is included in the light guide.

70. The photodynamic therapy light source of claim 61
35 wherein the second filter wheel includes a tilt mechanism for tilting the filter wheel to shift the bandwidth provided by each of the filter elements of the second

- 35 -

filter wheel.

71. The photodynamic therapy light source of claim 54 wherein the photodynamic therapy light source also
5 includes a light intensity unit for measuring the intensity of light provided to the patient from the filter means and for determining the dose applied to the patient based on the intensity of the light, and also the distance the light guide will be held away from the patient during
10 treatment of the patient.

72. The photodynamic therapy light source of claim 55 wherein the control means is connectable to an external computer for storing the database and for enabling user
15 input of commands and data.

73. The photodynamic therapy light source of claim 55 wherein the controller is also for receiving data from the external computer relating to the first and second time
20 periods, and also the frequency or pulse of modulation during the first time period when illumination is applied to the patient.